ISU Economics 671, Econometrics 1 (Fall 2011)

This class has three goals. You are going to study and learn some fundamental techniques in econometrics and statistics so that you can use them in your future research. You are also going to learn some of the basic theoretical concepts in econometrics so that you can understand new techniques when you encounter them in future classes and later in your career. Finally, you're going to learn how to use a computer to do statistical and econometric analysis.

Contact information

If you have questions about the course material, the best times to address them are in the scheduled lectures or during office hours. We can probably resolve questions or concerns about the course administration over email, but if you have urgent questions please call me or stop by my office.

Instructor:	Gray Calhoun	gcalhoun@iastate.edu	Heady 467	(515) 294-6271
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My webpage is http://www.econ.iastate.edu/~gcalhoun. I'll post any handouts I distribute in class there.

Scheduling

The class will meet twice a week for almost two hours. The next table lists the most important times and dates. If you have any conflicts please let me know as soon as possible.

Lectures	Tuesdays and Thursdays, 9:00–10:50 a.m.
Review sessions	Fridays, 9:00–10:50 p.m.
Instructor office hours	Tuesdays and Thursdays, 11:00–11:50 a.m.
TA office hours	Mondays and Wednesdays, 2:10–3:40 p.m.
Midterm exam	Tuesday, October 18, 9:00–10:50 a.m.
Final exam	Friday, December 16, 7:30–9:30 a.m.

The weekly review session will be used primarily for discussion of the homework and practice questions, but will also be used to present new material that supplements the regular lecture.

Grading

Your final grade will be based on two exams and some homework exercises. The breakdown is listed in the following table. Note that the "final" exam is worth the same as the "midterm" exam.

Midterm exam	1/3
Final exam	1/3
Mathematical questions	1/6
Computer assignments	1/6

Computer assignments will be due every other week. Moreover, every Friday you must hand in a question of your own and a detailed answer to be graded. The question must be related to the topics we're covering in class at the time, and will be graded on how interesting and difficult, they are and on the clarity and elegance of your solution. The best approach will be to think of and answer many questions, then choose the best one and polish your answer before handing it in.

Software

You need to learn how to program a computer to do statistical and econometric analysis. We're going to use the programming language R in this class—it is a specialized programming language that is designed for sophisticated data analysis. It has three advantages over other statistical packages: it is very extensible, so designing and using new estimators is easy; the graphics it produces are excellent; and it is free (other packages have their own advantages as well, obviously). Also, I use R in my own research so my advice on programming is more likely to be useful than if we were to use another language. You can download the latest version of R from the website `http://www.r-project.org`. Some good introductions to the language are: [VR00], [VR02], [KZ08], and [VSR]

Reading

The required textbooks are [CB02], [Gre12], and [KZ08]. [CB02] gives a good explanation of basic probability and statistics. [Gre12] will be a useful reference later in your career and covers many econometric estimators. [KZ08] is relatively cheap and is also available online through the library (we have an institutional subscription to SpringerLink, which is the publisher's website for e-books). You may want to save pdf versions of its chapters to your computer instead of purchasing the book from the bookstore. You should also download and install the R package that accompanies this book, called the *AER* package.

You'll be required to buy [Hay00] next semester, so you may want to buy it now as another source of material. You can download free manuals for R from `http://cran.r-project.org/doc/manuals.html`. I've included some other papers of potential interest below.

Course Material

The first exam will cover basic probability and statistics, and the second exam will cover basic regression analysis. The reading in [Gre12] and [KZ08] is required; [CB02] is optional but recommended.

Overview	Introduction	Lecture 1	[Gre12] 1; [KZ08] 1, 2
Part 1	Basic Probability	1–4	[Gre12] B; [CB02] 1–4, 10; [KZ08] 7.1
	Basic Statistics	5–8	[Gre12] C, 16; [KZ08] 7.3; [CB02] 5.1–5.4, 7–9
	Large Sample Theory	9–14	[Gre12] D, 14, 15.4; [CB02] 5.5, 10
Part 2	Basic linear regression	18–20	[Gre12] A, 2–4; [KZ08] 3.1–3.4; [CB02] 11
	Endogeneity and Causality	21–23	[Gre12] 8; [IW09]
	Inference and Modeling	24–27	[Gre12] 5; [CB02] 11; [RSW08]
	Robustness	28–30	[Gre12] 6, 9, 10; [KZ08] 3.7, 4.1–4.3; [Whi80]

References

[CB02] George Casella and Roger L. Berger. *Statistical Inference*. Duxbury, 2nd edition, 2002.

[Gre12] William H. Greene. *Econometric Analysis*. Prentice Hall, 7th edition, 2012.

[Hay00] Fumio Hayashi. *Econometrics*. Princeton University Press, 2000.

[IW09] Guido W. Imbens and Jeffrey M. Wooldridge. Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, 47(1):5–86, 2009.

[KZ08] Christian Kleiber and Achim Zeileis. *Applied Econometrics with R*. Springer, 2008.

[RSW08] Joseph P. Romano, Azeem M. Shaikh, and Michael Wolf. Formalized data snooping based on generalized error rates. *Econometric Theory*, 24(2):404–447, 2008.

[VR00] William N. Venables and Brian D. Ripley. *S-Programming*. Springer, 2000.

[VR02] William N. Venables and Brian D. Ripley. *Modern Applied Statistics with S*. Springer, New York, 4th edition, 2002.

[VSR] William N. Venables, D.M. Smith, and R Development Core Team. *An Introduction to R*.

[Whi80] Halbert White. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4):817–838, 1980.